

TYPHOON KELLY (15W)

Typhoon Kelly was quite representative of the first half of the 1984 season which was characterized by numerous high latitude, fast-moving systems. This typhoon developed at the southern end of a shear line and displayed some erratic movement during its formative stages before accelerating to the north-northwest towards a mid-level cut-off low. During the last phase of its life, Kelly recurved very sharply to the northeast and transitioned into an extratropical system.

During the first week of September, a strong frontal system moved across the North Pacific Ocean and left in its wake a quasi-stationary shear line extending between 20N 170E and 35N 180E. On 11 September the southern portion of the shear line became detached and began to take on tropical characteristics.

During the next two days the disturbance slowly developed as the associated convection increased in organization. At 0000Z on the 13th, an exposed low-level circulation was observed on satellite imagery west-northwest of the main convection. Dvorak intensity analysis of the 130000Z imagery estimated that 30 kt (15 m/s) surface winds were present near the center. Sparse synoptic data indicated a 20 to 25 kt (10 to 13 m/s) circulation was present. Based on this information, a TCFA was issued at 130435Z and an aircraft investigative mission was requested for the following morning. Throughout the evening the system continued to develop with the convection showing a

considerable increase in organization. This prompted the issuance of the first warning at 131800Z. While this was occurring in the south, a mid-level cold core low was developing further north on the northern remnants of the shear line. This cut-off low and the mid-latitude westerlies just north of it would be the principal steering mechanisms for Kelly.

As long as Kelly stayed below tropical storm strength it moved slowly. Satellite fixes on the 13th indicated Kelly moved in a cyclonic loop about its point of origin. However, after it became a named storm, Kelly accelerated to the north and eventually to the northwest as it was caught in the southerlies between the mid-Pacific high and the inflow pattern about the cut-off low. Because of its relatively high latitude, Kelly entrained cold air into its circulation almost from the start, and was slow to intensify. By 141800Z there was a noticeable "dry slot" forming and the storm took on a north-south orientation (Figure 3-15-1).

As Kelly approached the cold low (Figure 3-15-2) it slowed and reached maximum intensity. Then suddenly, under the influence of the mid-latitude westerlies just to the north, it abruptly turned and accelerated to the northeast. Although JTWC forecasts indicated recurvature to the northeast would occur, it was not forecast to begin until Kelly reached 35N. It now appears the westerlies were located further south than Figure 3-15-2 indicates. Kelly



Figure 3-15-1. Kelly as an intensifying tropical storm. Kelly was accelerating to the north-northwest at this time (142259Z September DMSP visual imagery).

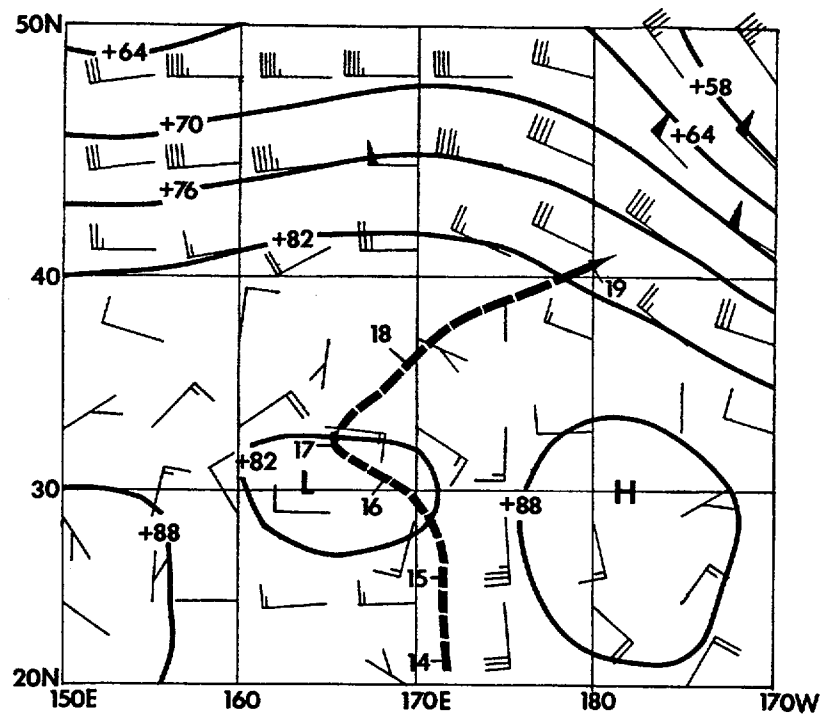


Figure 3-15-2. Mid-level tropospheric flow representative of the conditions present during the time Kelly was accelerating to the north and at the time of recurvature to the northeast. The simplified track of Typhoon Kelly is the dashed line (160000Z September 500 mb FNOC NOGAPS analysis).

weakened very rapidly after recurvature as the convection began to be sheared. By 171200Z the storm had started to lose its tropical characteristics.

In this phase, Kelly began to demonstrate intensity anomalies frequently observed in storms becoming extratropical. The low central pressures observed did not correspond well with the relatively weak winds found by aircraft reconnaissance. On

the other hand, since the central convection had nearly disappeared, the Dvorak intensity model estimated winds significantly lower than what was observed by aircraft. By 180000Z Kelly had completed its extratropical transition and the final warning was issued. The remnants of Kelly continued to the northeast and were locatable on satellite imagery until the 21st. By then the system was east of the International Dateline and moving into the Gulf of Alaska.